

SEF – ISYS1117/ISYS1118 exam

s2 2008

SOLUTIONS

Question 1 (1 + 1 + 1 + 1 = 4 marks)

For each of the following software requirements, say whether or not it is a well written requirement. Justify each of your answer in 1-3 sentences.

- a) It must be possible to store latitude and longitude information with each photo.
- b) The telephone system should provide high availability.
- c) Doctors are the only employees that can enter a patient's health information into the system.
- d) Comments written in the program should be informative.

- a) is a good requirement as it can be tested.
- b) a poorly written requirement. It cannot be tested as we have no idea what "high availability" means.
- c) a good requirement – it can be tested.
- d) a poorly written requirement. It cannot be tested as we have no idea what "informative" means.

Question 2 (4 marks)

List two features that activity diagrams and class diagrams have in common.

Your answer should be about 2-4 sentences.

An activity diagram has swimming lanes which can represent classes in the system
The behaviours that are listed in the diagram may be behaviours that are associated with a particular class.

Question 3 (4 marks)

Explain the difference between white and black box testing. Your answer should be 2-4 sentences long.

Black box testing tests a component only against its observable interface, i.e. its published behaviour.

White box testing relies on understanding the internals of a module, and producing tests appropriate for the implementation.

Changing the implementation, but not behaviour of a module would result in the white box tests changing, but not the black box tests.

Question 4 (5 + 5 = 10 marks)

Consider the diagram below.

- Construct a class diagram suitable for representing this information.
- Create an object diagram from the following data based on your class diagram.

Title : Catch-22
Genre : Satire
Author : Joseph Heller
Publisher : Simon & Schuster
Summary : John Yossarian attempts to stay alive during WWII

Title : Zen and the art of motorcycle maintenance
Genre : Philosophy
Author : Robert Pirsig
Publisher : Harper
Summary : A study in the metaphysics of quality

Title : The House of the Dead
Genre : Social commentary
Author : Fyodor Dostoevsky
Publisher :
Summary : Life in a Siberian prison camp

Author : Robert Pirsig
Date of birth : 6th Sep 1928
Date of death :
Publications:
Zen and the art of motorcycle maintenance (1974)
Lila: An Inquiry into Morals (1991)

Author : Fyodor Dostoevsky
Date of birth : 11th Nov 1821
Date of death : 9th Feb 1881
Publications:
The House of the Dead (1862)
Notes from Underground (1864)
Crime and Punishment (1866)
The Gambler (1867)

Classes : Book, Author, Publisher

Question 5 (5 + 5 + 3 = 13 marks)

Consider the information presented below

- Create a use case diagram for this problem.
- Create a class diagram that models this problem.
- Create a sequence diagram for the creation of the histogram.

Amazon allows people who log in to their website to post reviews on books. You can see all of the reviews for a given book, or you can view all the reviews made by a person. When a review is given the person also has to rate the book on a scale from 1 to 5.

A histogram of the ratings, and the number of people who have given it each rating, is produced whenever the book review page is viewed.

Customer Reviews



Use case includes

log in

review book

produce histogram

view review – extensions for view by author, view by book

classes

book, reviewer, review

sequence diagram

step through each of the reviews for a book inspecting the review count

Question 6 (10 marks)

Create a state diagram for a seminar, based on the following description.

A seminar is initially proposed to run by a university. If a room and time is available then the seminar is scheduled, and a booking website is set up. Once set up the seminar is advertised and bookings are taken.

When the seminar is fully booked the website indicates there are no more positions available. If someone cancels his or her booking the booking system is opened up again. Bookings are permanently closed off 1 week before the start of the event.

The seminar can be cancelled at any time before bookings are permanently closed off.

Starts with “Proposed” ---> “composite state for “confirmed” which has full/not full.
can exit from larger state via cancelled. can move to “inevitable” via event 1 week before start of seminar.

Question 7 (7 marks)

Draw a class diagram for the following problem.

Filming a movie is a complicated process that involves many people and considerable computer support.

As the filming takes place the recordings are loaded onto a computer by the cameraman. Each individual filming session (from start recording to end recording, a “shoot”) is date and time stamped. As well the location (a collection of GPS coordinates) is also recorded so that the crew can return to the scene later if needed.

The shoots are edited by cutting them into “cuts” (each with a start and end time) and assembling the cuts into a single product. The system maintains information about the cut points (start and end times) so that they can easily be adjusted later.

classes are
film
shoot
cut
GPS coordinate

Question 8 (5 + 2 + 2 + 1 = 10 marks)

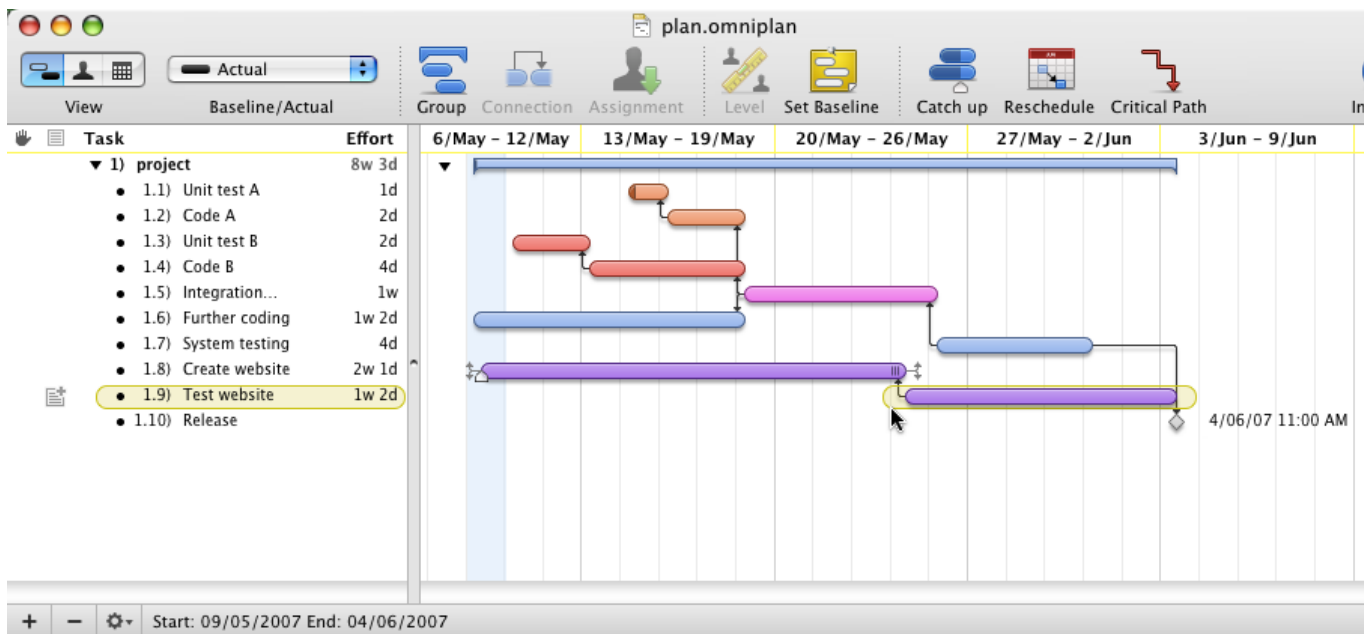
Given the following information...

Task id	Task	Duration
1	Create unit test for class A	1
2	Create unit test for class B	2
3	Release	0
4	System testing	4
5	Integration testing	5
6	Create web support site	11
7	Code class A	3
8	Code class B	6
9	Test web support site	17
10	Code class C	4

- a) Draw a Gantt chart showing the order tasks should occur in. You can assume you are not constrained by resources. You should number each activity as well as showing the name of each task.
- b) Determine which tasks are on the critical path, and how long that path is.
- c) Draw an activity diagram for this workflow.
- d) If there was only one employee, which tasks would be on the critical path, and how long would it be?

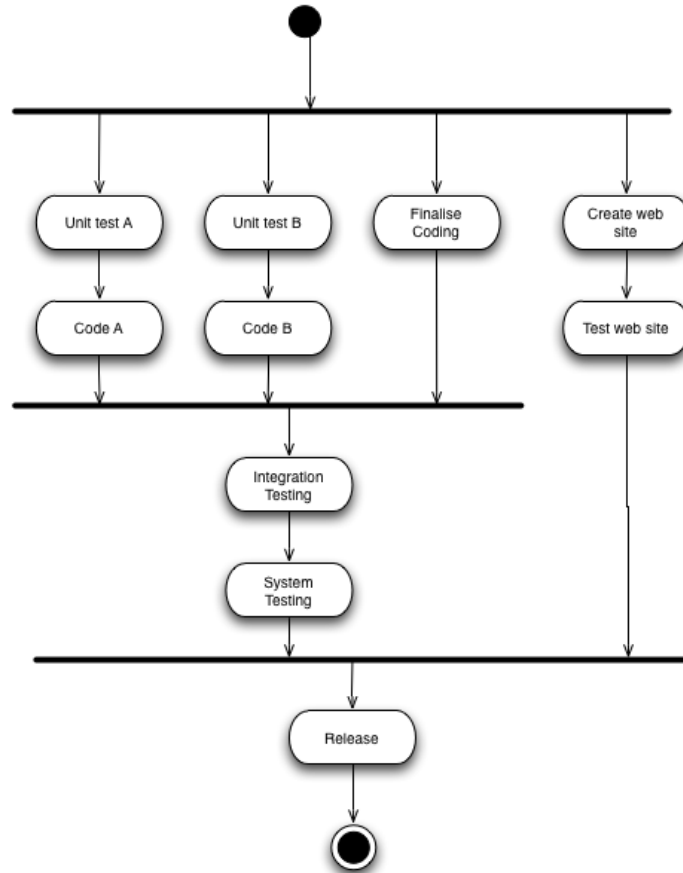
Answers (NOTE same question as on the 2007 s1 exam!)

a)



b)
Create website, test website on critical path, total duration = 28 days

c)



Marking:

2 ½ marks for parallel activities

1 ½ mark for correct order/activities

1 mark for start/stop

d)

All tasks would be on the critical path, duration = total of all the days = 53

QUESTION 9 (5 marks)

Discuss the concepts of **Risk Mitigation**, **Contingency Planning** and **Transition Monitoring** for the following problem. You should write 2-3 sentences for each concept.

A small company decides to write an iPhone application using the language Objective-C which they have not used before. They send their two staff on a training course, and buy appropriate laptops for them to develop on.

The laptops are delivered on time and but one of them is faulty and has to be sent back. The programmer is unable to work on the project for the next 3 weeks. This causes the project to be delivered late and in the mean time another company produces a similar

application that is very popular. When their project is finally delivered it is mostly ignored because of the success of the rival product.

The risks are...

Lack of Objective-C knowledge/ability

Being beaten to the market by a rival company

Hardware failure

A sample solution for one of the risks is...

Risk Mitigation,

They should have had ordered more than one laptop per programmer so that the risk of losing one would not be great.

Contingency Planning

They could have investigated lease options/other sources of laptops/bought a 2nd laptop

Transition Monitoring

In this case its quite simple – just noting if a computer is broken.

QUESTION 10 (5 marks)

For the following description classify each activity and event with the corresponding Rational Unified Process' concepts of **phases** and **increments**.

Your answer should be around ½ - 1 page long.

A company decides that there may be a market for a program that allows you to send SMS messages from a users computer to a bluetooth attached mobile phone.

They investigate the market profile of various phones and the features they have before deciding that building the software is viable and financially feasible, and that they will only support 20 models of phone initially.

They then purchase each of the phones and examine their programming environment before settling on an overall architecture for the program.

The program is written over a period of 7 months at which point they make it available for purchase from their website.

The response is moderate as a number of bugs cause customers not to purchase it after the free trial period. They decide that fixing those bugs will be worthwhile in terms of new purchases, which they do.

The next release they made included support for another 10 mobile phones.

Inception:

A company decides that there may be a market for a program that allows you to send SMS messages from a users computer to a bluetooth attached mobile phone.

Elaboration:

They investigate the market profile of various phones and the features they have before deciding that building the software is viable and financially feasible, and that they will only support 20 models of phone initially.

They then purchase each of the phones and examine their programming environment before settling on an overall architecture for the program.

Construction & Transition.

The program is written over a period of 7 months at which point they make it available for purchase from their website.

This represents the first increment.

This doesn't really factor into the model very well.

The response is moderate as a number of bugs cause customers not to purchase it after the free trial period.

inception phase

They decide that fixing those bugs will be worthwhile in terms of new purchases,

elaboration/construction/transition
which they do.

The next release also includes support for another 10 mobile phones.